Progress Report of China's National Carbon Market (2024)

Ministry of Ecology and Environment of the People's Republic of China

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Contents

Forward

The carbon market leverages a market-based mechanism to control greenhouse gas emissions and promote green and low-carbon transition of the economy and society. Accelerating China's National Carbon Market development and fully grasping the decisive role of the market in resource allocation is crucial for ensuring that emission mitigation responsibilities are assumed, achieving emission control targets, and reducing emissions abatement costs in various sectors.

The Chinese government attaches great importance to the development of the national carbon market. The report to the 20th National Congress of the Communist Party of China (CPC) proposed to improve the carbon emissions trading system. President Xi Jinping called for creating a more effective, vibrant, and internationally influential carbon market. China's National Carbon Market consists of both a compliance emissions trading system and a voluntary emissions reduction trading market. While each has its own focus and operates independently, these two markets are interconnected through an offsetting mechanism for China Carbon Emission Allowances surrendering and together they form the national carbon market system. Since 2023, the State Council promulgated and implemented the Interim Regulations for the Management of Carbon Emission Trading and the second compliance cycle of the national carbon emissions trading market has successfully concluded. The National Voluntary Greenhouse Gas Emission Reduction Trading Market was also officially launched, significantly boosting market vibrancy. The role of

the carbon market in promoting emission reductions across sectors has been elevated, and China's carbon pricing mechanism, with the national carbon market playing the principal role, has basically taken shape.

The construction and development of China's National Carbon Market has attracted significant attention and widespread interest both domestically and internationally. The Ministry of Ecology and Environment has organized the compilation of this report, which aims to introduce the progress and main achievements of China's National Carbon Market and to share development perspectives and relevant policy design considerations, hoping to enhance domestic and international recognition and support. This report focuses on the construction of the National Carbon Emission Trading System, market operations in the second compliance cycle, China Carbon Emission Allowances allocation and surrender, and data quality management. This report also shares the progress since the launch of the National Voluntary Greenhouse Gas Emission Reduction Trading Market , as well as the development of the national carbon market's infrastructure, achievements, and international cooperation. Additionally, the report provides an outlook on the future development of China's National Carbon Market.

Abstract

The Chinese government attaches great importance to addressing climate change and has positioned climate action as a key lever for enhancing ecological conservation and pursuing high-quality development. China continues to implement an active national strategy in response to climate change, adopting a series of policies and measures to strive for carbon emissions peaking before 2030 and carbon neutrality before 2060 (hereinafter the "dual carbon" goals). Among these measures, the carbon market serves as an essential policy tool for China to promote cost-effective carbon emissions reduction across sectors and to achieve the "dual carbon" goals. It also plays a fundamental role in China's carbon pricing mechanism.

The influence of China's National Carbon Market continues to expand

China's National Carbon Emission Trading System covers the largest amount of greenhouse gas emissions globally

In accordance with the decisions and plans of the CPC Central Committee and the State Council, and drawing experience from international carbon markets and practices of domestic pilot markets, the National Carbon Emission Trading System (hereinafter the "National ETS") started trading in July 2021. Beginning with the power sector, it now includes 2,257 key emitting entities, covering about 5.1 billion tonnes of annual carbon dioxide (CO_2) emissions—more than 40 percent of China's total CO_2 emissions, making it the world's largest market in terms of the amount of greenhouse gas emissions covered.

Compliance and voluntary markets form China's National Carbon Market, harnessing policy synergy

In January 2024, the National Voluntary Greenhouse Gas Emission Reduction Trading Market (hereinafter the "National Voluntary Market") was officially launched, another policy tool for accomplishing the "dual carbon" goals, following the launch of the National ETS. The compliance market strictly controls carbon emissions of key emitting entities, while the National Voluntary Market encourages society-wide engagement. The two markets operate independently but are interconnected through an offsetting mechanism for China Carbon Emission Allowances (hereinafter "CEAs") surrendering. Together, they form China's National Carbon Market.

China's National Carbon Market has contributed an innovative "Chinese approach" to the global carbon market

China's National Carbon Market significantly impacts global carbon prices and the effectiveness of carbon trading mechanisms around the world; its development and operation have drawn substantial international attention. The National ETS, with its intensity-control objectives, demonstrates the flexibility and applicability of the carbon market-based mechanism. The National ETS has contributed an innovative "Chinese approach" to the global carbon market mechanism.

Construction of China's National Carbon Market progressed significantly

The Interim Regulations for the Management of Carbon Emission Trading has been released and come into force and the fundamental regulatory framework has been established

In January 2024, the State Council issued the Interim Regulations for the Management of Carbon Emission Trading, which is China's first specialized legislation in the field of climate change. It was taken into effect on May 1, 2024, forming the National ETS's fundamental policy and regulatory framework along with the ministerial measures, normative documents, and technical standards. Ecology and environment authorities and other relevant government agencies at each level, key emitting entities, registries, trading institutions, and technical service institutions have assumed their respective responsibilities to ensure the smooth operation across all aspects of the National ETS, including emission data accounting, reporting and verification, CEAs allocation and surrendering, and trading and market supervision.

Successful conclusion of the second compliance cycle of the National ETS and a steady increase in market vibrancy

The supply and demand of CEAs in the second compliance cycle for the National ETS was generally balanced, aligning with policy expectations. By the end of 2023, the compliance rate for 2021 and 2022 were 99.61 percent and 99.88 percent, respectively, an improvement compared to the first compliance cycle and ranking among the top international carbon markets. From January 1, 2022 to December 31, 2023, the trading volume of CEAs was 263 million tonnes, with a transaction value of 17.26 billion yuan. The scale of trade expanded, and CEAs price showed a steady rise, with the number of key emitting entities participating in trading up by 31.79 percent compared to the first compliance cycle. The flexible compliance mechanisms helped 202 key emitting entities facing difficulties fulfill their compliance obligation.

Emission data quality has been comprehensively improved and digital infrastructure provides solid support to the national carbon market

The Chinese government attaches great importance to and continues to strengthen data quality management and optimize accounting and verification methods, keeping monthly records on key emissions data and implementing a three-tier joint review system of emission data at national, provincial, and municipal levels. Intelligent early warning systems utilizing information technology tools like big data were adopted, along with supervision and support in key areas. A closed-loop management mechanism of "timely detect- transfer to relevant departments for handling and supervision - check and rectification" to address issues was established, assuring data quality and meeting the data needs of the smooth and orderly operation of the National ETS. The National Carbon Trading Market Management Platform, registration system, trading system, and other infrastructures operated safely and stably, achieving interconnection and communication among various systems. This led to online management of all processes, data centralized throughout entire procedures, and comprehensive decision-making on a scientific basis, significantly enhancing data quality management capabilities of carbon emissions.

Effectiveness of China's National Carbon Market development gradually increases

Enterprises' carbon emission management capabilities have been strengthened and the effectiveness of emission reduction of sectors was enhanced

China's National Carbon Market has ensured that enterprises fully assume their responsibilities to abate carbon emissions, raising society-wide low-carbon awareness that "emissions come at a cost and reductions yield benefits." Most key emitting entities conducted methods to measure values of elemental carbon content. By offering enterprises flexibility to curtail emissions, the carbon market's guiding role in greenhouse gas reduction and facilitating energy mix adjustment has become gradually evident. In 2023, the emission intensity of national thermal power generation (CO_2 emissions per unit of electricity by thermal power generation) decreased by 2.38 percent compared to 2018, while the emission intensity of electricity generation (CO_2 emissions per unit of electricity generation) decreased by 8.78 percent compared to 2018.

Fundamental role of carbon pricing mechanism has begun to take effect, promoting high-quality green and low-carbon development

On April 24, 2024, the closing price of the National ETS exceeded 100 yuan per tonne for the first time. The green finance attributes of CEAs are gaining recognition from an increasing number of financial institutions, with CEAs prices being seen as an anchor for climate investment and financing, carbon asset management, and allowance pledging. This encouraged green and low-carbon investment led to notable improvements in energy efficiency within the thermal power generation sector, facilitating energy mix adjustment and promoting high-quality green and low-carbon development.

Carbon emission statistics and accounting systems have been consolidated and the technical service system and market have begun to take shape

Efforts have been made to establish a carbon emission statistics and accounting institutional system for key sectors that suits China's national circumstances, providing essential data support for formulating and releasing the annual CO_2 emissions factor for electricity generation, the regional power grid baseline emission factor, and establishing and improving the carbon footprint management system. A large number of professionals and relevant entities have been cultivated through strengthening institutional management, clarifying responsibilities and liabilities, optimizing technical specifications, and enhancing supervision and inspection. This has laid a solid foundation for achieving the "dual carbon" goals. In 2023, over 50 consulting firms, more than 450 inspection and testing institutions, and nearly 100 verification agencies provided third-party technical services to key emitting entities and government regulatory authorities. Provincial ecological and environmental authorities evaluated the services provided by technical verification agencies. Among the 16,611 evaluations rating the timeliness and quality of work, 99.7 percent were rated as qualified.

Looking ahead, the Chinese government will continue to enhance China's National Carbon Market and to deepen international exchange and cooperation in the carbon market, accelerate the process of developing a more effective, vibrant, and internationally influential carbon market, and strive to make greater contributions to addressing global climate change.

I. The Chinese government attaches great importance to the development of China's National Carbon Market

The Chinese government attaches great importance to addressing climate change, viewing it as a crucial lever for enhancing ecological conservation and achieving high-quality development. The government continues to implement a national strategy to combat climate change, adopting a series of policies and measures to achieve the "dual carbon" goals. China's National Carbon Market is an essential institutional arrangement that utilizes market mechanisms to control greenhouse gas emissions. It is an important policy tool to achieve the "dual carbon" goals and plays a fundamental role in carbon pricing.

President Xi Jinping emphasized the establishment of China's National Carbon Market as a key measure to address climate change at the Paris Conference on Climate Change. The "1+N" policy documents for carbon peaking and carbon neutrality, including the Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy and the Action Plan for Carbon Dioxide Peaking Before 2030, position the National ETS as an essential policy tool for achieving the "dual carbon" goals. The report to the 20th CPC National Congress proposed to improve the

carbon emissions trading system.

Since 2023, requirements on China's National Carbon Market development have been further clarified in relevant major conferences and policy documents. The National Conference on Ecological and Environmental Protection proposed building a more effective, vibrant, and internationally influential carbon market. The Opinions of the CPC Central Committee and the State Council on Comprehensively Advancing the Building of a Beautiful China made overall plans for and demanded further progress of China's National Carbon Market, which includes the steady expansion of sector coverage, the enrichment of trading product varieties and methods, and the setting up and improvement of the National Voluntary Market. China's 2024 Report on the Work of the Government listed expanding sectorial coverage of the National ETS as a government task of the year.

The innovative development of China's National Carbon Market is encouraging market entities to innovate green and low-carbon technologies with higher efficiency and lower cost, providing inexhaustible impetus for the development of new quality productive forces.

II. The institution of the National Carbon Emission Trading System is gradually improving

After three years of development and operation, the institutional framework of the National ETS has been basically established, its legal basis has been strengthened, and supporting technical standards have continued to be refined, laying a solid foundation for the stable and orderly operation of the market.

i.Release and implementation of the Interim Regulations for the Management of Carbon Emission Trading

On January 25, 2024, the State Council promulgated the Interim Regulations for the Management of Carbon Emission Trading (hereinafter referred to as "the Regulations"), which came into effect on May 1, 2024. The Regulations is China's first specialized legislation in the field of addressing climate change, clarifying the primary aspects of carbon emissions trading market activities and the legal responsibilities of entities involved. The Regulations strengthens legal supervision and management and introduced severe penalties for violations (as shown in Figure 1). This underscores the legal principle of using the strictest systems and most rigorous rules of law to protect the ecological environment, marking it a

significant milestone. The issuing of the Regulations demonstrated China's resolve and confidence in actively addressing climate change and its sense of duty as a responsible major country.

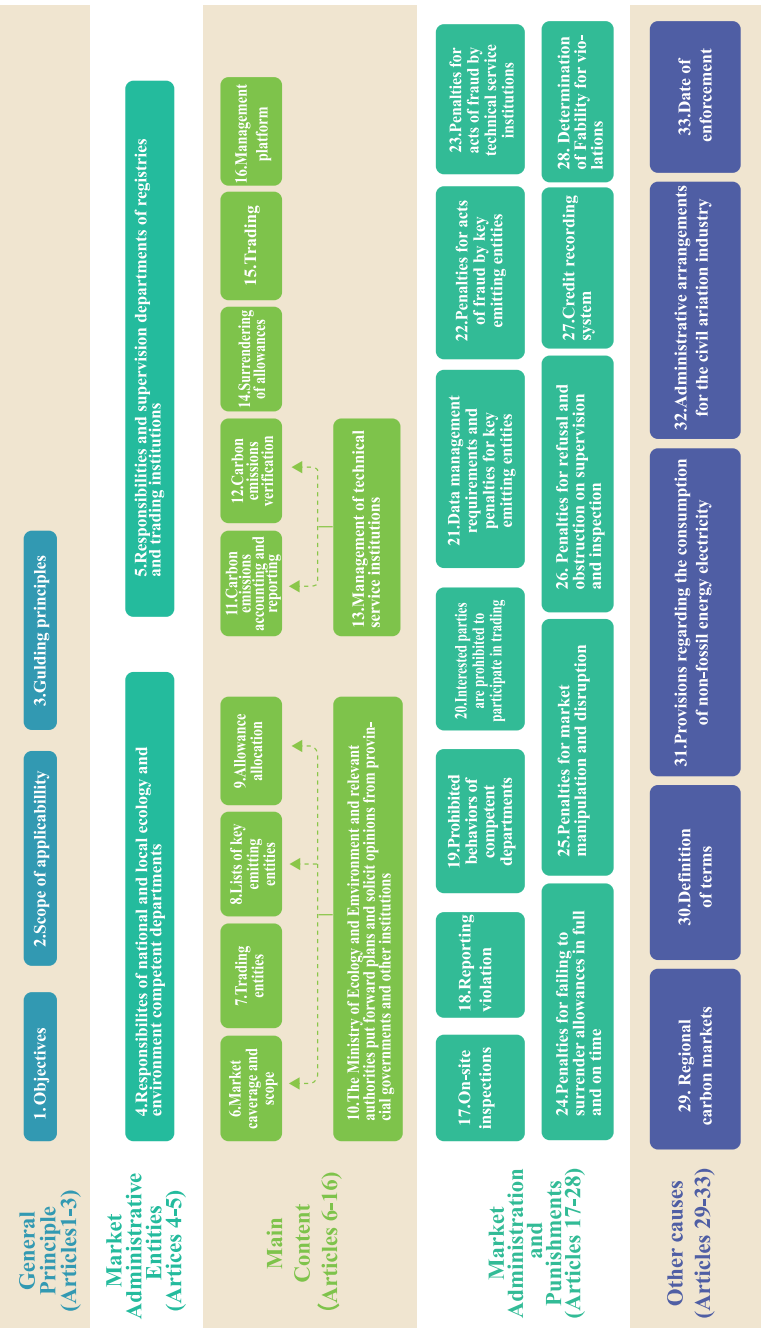

Figure 1. Framework for the Interim Regulations for the Management of Carbon Emission Trading

Column 1: the Interim Regulations for the Management of Carbon Emission Trading

The Regulations, for the first time in the form of administrative regulation, clearly defines carbon emissions trading-related activities. It stipulated key management tasks for authorities of ecology and environment at national and local levels, including identifying key emitting entities, submitting emission data and verifying annual reports, CEAs allocating and surrendering, and market trading. The Regulations clarifies the roles of key emitting entities, registration institution, trading institution, and third-party technical service entities in supporting and ensuring market operations. It also specifies penalties for behaviors such as failure to surrender CEAs in full and on time and emission data fraud, thereby solidifying the legal foundation for the healthy development of the National ETS.

The Regulations adheres to a problem-oriented approach, follows the general principles of strengthening full process management, maintaining appropriate flexibility, and severely punishing illegal and non-compliant activities, and thereby building a fundamental institutional framework for carbon emissions trading management. ***First, the coverage of the Regulations leaves no blind spots.*** *The Regulations clearly define the main components of carbon emissions trading and all types of participating entities and specifying legal responsibilities for illegal and non-compliant activities.* ***Second, key components are targeted precisely.*** *Specific requirements and penalties have been developed for key management aspects of the National ETS, such as emission data accounting, reporting and verification, CEAs surrender, and market trading. Penalties are intensified for serious violations to serve as an effective legal deterrent.* ***Third, penalty measures are diverse.*** *The Regulations stipulates various administrative penalties for illegal and non-compliant activities, including fines, confiscation of unlawful gains, orders to suspend production, prohibition from engaging in the business, and revocation of certifications.*

ii.Completion of the fundamental policy and regulatory framework for the National ETS

The Ministry of Ecology and Environment has issued the Measures for the Administration of Carbon Emissions Trading (Trial) and released three rules for registration, trading, and settlement. The Ministry has

also formulated and revised normative documents such as guidelines for emission accounting, reporting and verification, and CEAs allocation plans. Together with the Regulations, these efforts formed a multi-level system encompassing "administrative regulations + ministerial measures + normative documents + technical standards" (as shown in Figure 2).

In August 2023, the Supreme People's Court and the Supreme People's Procuratorate revised and issued the Interpretation on Several Issues Concerning the Application of Law in Handling Criminal Cases of Environmental Pollution. This interpretation includes the falsification of carbon emission data by third-party technical service entities, such as emission verification agencies, consulting agencies, and inspection agencies, within the scope of criminal jurisdiction. It clarifies sentencing standards and serves as a deterrent of the criminal justice system.

Figure 2. Policies and regulatory framework for the National ETS

iii.Improved operational mechanism of the National ETS

The National ETS has formed a comprehensive system architecture, including emission data accounting, reporting and verification, CEAs allocation and surrendering, market trading, and supervision (as shown in Figure 3). Competent government authorities are responsible for making CEAs allocation plans and issuing annual CEAs to key emitting entities. Key emitting entities are required to measure and report their emission data from the previous year on an annual basis, which is then verified by competent government authorities. Key emitting entities are required to surrender CEAs equivalent to their emissions to fulfill their compliance obligation before the deadline. The National ETS offers flexibility for key emitting entities to meet their emission mitigation responsibilities through CEAs trading. To ensure its effective operation, the Ministry of Ecology and Environment has developed various information systems, including a market management platform, a registration system, and a trading system for the National ETS. The National Carbon Trading Market Management Platform records emission-related data of key emitting entities. The national carbon emissions registration system documents information on the holding, changes, surrendering, and cancellation of CEAs and provides settlement services. The national carbon emissions trading system ensures the centralized and unified trading of CEAs within National ETS.

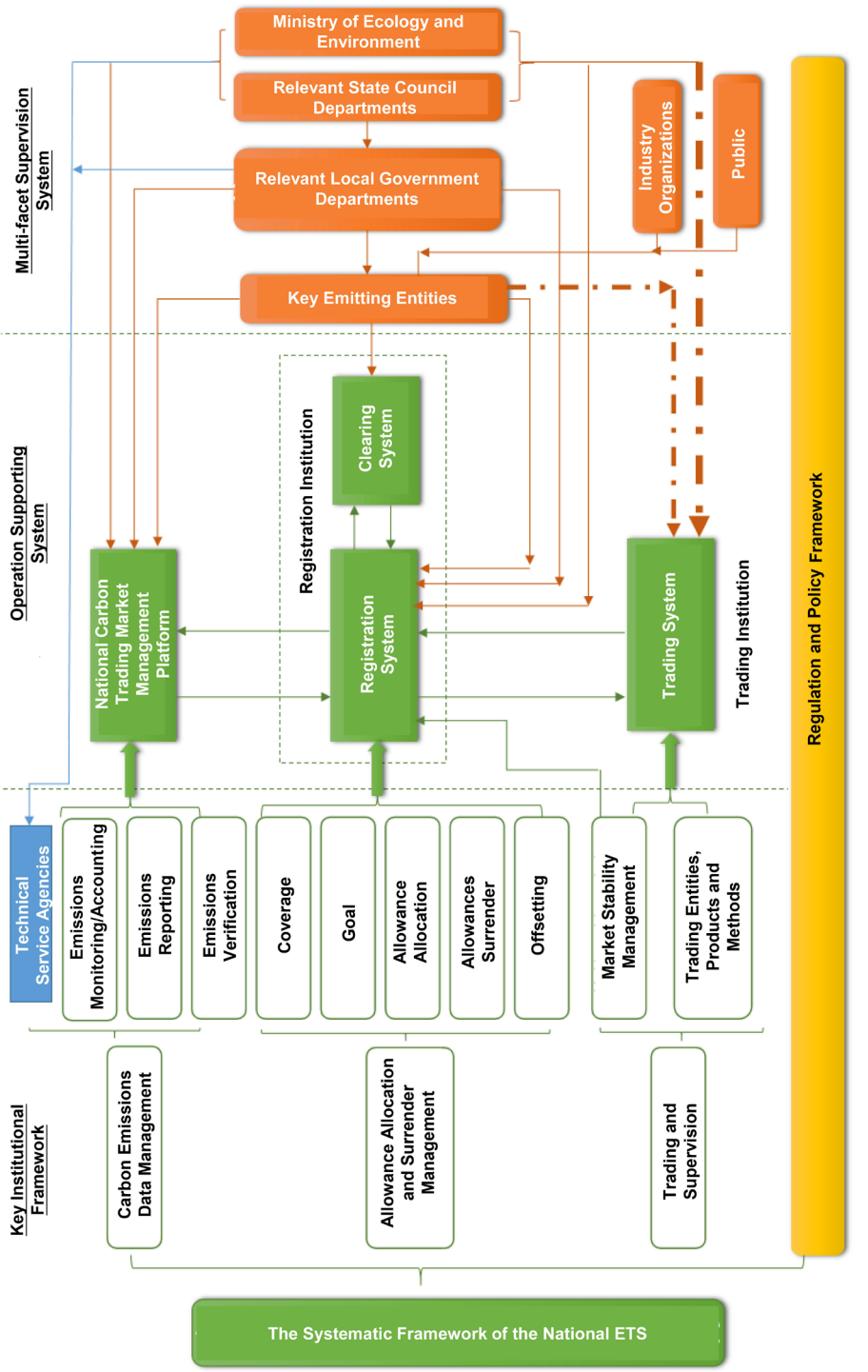

Figure 3. Architecture of the National ETS

III. Increased market vibrancy of the National Carbon Emission Trading System

The second compliance cycle (2021-2022) of the National ETS included 2,257 key emitting entities in the power generation sector (including captive power plants in other sectors), covering annual greenhouse gas emissions of approximately 5.1 billion tonnes of CO_2 equivalent, making it the largest emission market in the world.

By the end of 2023, the cumulative trading volume of CEAs in the National ETS reached 442 million tonnes, with a cumulative transaction value of 24.92 billion yuan (shown in Figure 4). During the second compliance cycle, the cumulative trading volume of CEAs was 263 million tonnes, with a cumulative turnover of 17.26 billion yuan. The trading scale has gradually expanded, with trading prices showing steady growth and participants becoming more active.

i.Scaling up trading

During the second compliance cycle of the National ETS, the cumulative trading volume and value of CEAs increased by 47.01 percent and 125.26 percent, respectively, compared to the first compliance cycle. The transaction volume of listed and bulk agreement trading increased by 33.93 percent and 49.73 percent, respectively. In July 2023, the Ministry of Ecology and Environment released a notice on CEAs surrender

for 2021 and 2022. Various regions in China organized key emitting entities to develop trading plans as early as possible. The trading volume continued to rise from August to October in 2023. The average monthly trading volume in the first half of 2024 reached 3.67 million tonnes, a year-on-year increase of 174.9 percent.

ii.Steady rise in trading prices

During the second compliance cycle of the National ETS, the composite price for market closing fluctuated between 50 and 82 yuan/tonne. By the end of 2023, the composite price for market closing was 79.42 yuan/tonne, an increase of 65.46 percent compared to the opening price on the first trading day and 46.48 percent higher than the closing price of the first compliance cycle. With the Regulations released and coming into full force as well as the continuous advancement of work related to the third compliance cycle, the market trading price has shown a steady upward trend. The composite price for market closing exceeded 100 yuan/tonne for the first time on April 24, 2024. It is a concrete manifestation of the market's role in resource distribution for carbon emission reduction, which gave further impetus to enterprises to pursue green and low-carbon transition.

iii.Increasingly active trading participants

In the second compliance cycle of the National ETS, transactions occur every trading day, with key emitting entities showing enthusiasm for engaging in market activities. Compared to the first compliance cycle, an additional 338 entities opened trading accounts from 2022 to 2023, the number of key emitting entities participating in trading increased by 31.79 percent, and the number of key emitting entities with multiple

transactions increased by 32.14 percent. The number of key emission entities with trading volume exceeding a million tonnes increased by 77.59 percent, while the number of key emission entities using both listing and bulk agreements trading rose by 36.87 percent. Key emitting entities have made trading plans as early as possible based on their own situations. The month with peak trading volume shifted from December to October, with a notable increase in active trading days[①]. After the end of the second compliance cycle, the average monthly trading volume and the average number of key emitting entities participated in the first half of 2024 increased by 49.54 percent and 90.79 percent, respectively, compared to the same period in 2022.

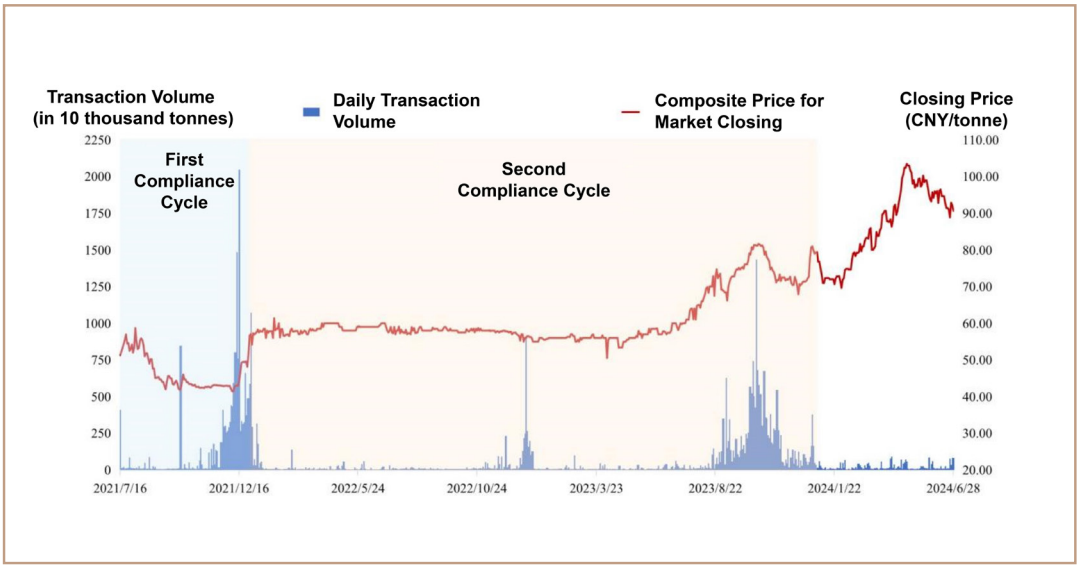

Figure 4. Transactions and prices during the first and second compliance cycles of the National ETS

① *Active trading days refer to the number of trading days where the daily trading volume exceeds the average level for that year.*

IV. Completion of CEAs allocation and surrender in the second compliance cycle

CEAs allocation and surrender are essential for the healthy, stable, and orderly operation of the National ETS and for achieving policy objectives. Based on national greenhouse gas emission control targets, the National ETS currently adopts an intensity-based benchmarking method for CEAs allocation. This approach aligns with the pace and efforts to achieve China's "dual carbon" goals.

i.Supply and demand of CEAs generally balanced

The National ETS issued 5.096 billion tonnes and 5.104 billion tonnes of CEAs for 2021 and 2022, respectively. The verified emissions (CEAs obligated to surrender) were 5.094 billion tonnes and 5.091 billion tonnes, resulting in surpluses of 1.47 million tonnes and 12.98 million tonnes. This represented 0.03 percent and 0.25 percent of the total CEAs allocated, respectively. The balance between the supply and demand of CEAs has been maintained for the second compliance cycle, meeting policy expectations. Meanwhile, key emitting entities used a total of 3.72 million tonnes of national certified voluntary emission reduction to offset their CEAs surrendering obligation.

ii.CEAs allocation plan further optimized

Compared to the first compliance cycle, CEAs allocation methods for 2021 and 2022 maintained policy continuity and stability in general while being optimized based on the circumstances of the power generation sector. **First,** different CEAs allocation benchmark values were adopted for 2021 and 2022, with the second year's benchmark values determined based on the previous year's actual emissions, making the benchmark value more aligned with sector realities. **Second,** a balance value was introduced for the first time as an important reference for setting electricity-generated and heat-generated benchmarks, effectively addressing significant deviations in determining benchmark values. **Third,** electricity-generated and heat-generated benchmarks for various types of generators were enhanced to reflect the sector emission. It reflects a policy orientation that incentivizes efficient and clean generators while constraining inefficient ones.

iii.CEAs surrender management mechanism established

First, a dynamic monitoring mechanism for compliance risks was developed. Timely assessment of the compliance risks of key emitting entities were carried out and relevant information was regularly notified to, enabling automatic early warning of compliance risks. **Second, targeted assistance programs were initiated.** Local ecological and environmental authorities comprehensively reviewed enterprises' CEAs surplus and shortfall situations. They visited enterprises with compliance difficulties, pushing them to develop compliance plans early, and providing targeted assistance. **Third, flexible compliance mechanisms were created.** To alleviate pandemic-related impacts

on some enterprises' CEAs surrendering, key emitting entities with high CEAs deficits were allowed to borrow CEAs, and tailored relief mechanisms were introduced for key emitting entities undertaking major public welfare tasks. The flexible compliance mechanisms helped 202 key emitting entities facing difficulties fulfill their compliance obligation.

By the end of 2023, the compliance rates for 2021 and 2022 were 99.61 percent and 99.88 percent, respectively, showing an improvement compared to the first compliance cycle and ranking China among the top international carbon markets. A total of 80 key emitting entities failed to comply fully and on time, which is 98 fewer than in the first compliance cycle. Local ecology and environment departments have handled these non-compliant entities in accordance with relevant regulations.

V. Improvement in emission data quality

The Chinese government attached great importance to and continuously strengthened the data quality management of the National ETS. It has established a set of emission accounting, reporting, and verification systems with Chinese characteristics that have proven to be effective. The basic capacity of power generation enterprises in carbon emission data statistics and accounting have been significantly enhanced. The standardization, accuracy, and timeliness of carbon emission reports have markedly improved, meeting the data needs for the sound and orderly operation of the National ETS.

i.Scientific accounting, reporting, and verification rules

To address challenges faced by key emitting entities in submitting samples for coal quality analysis and conducting on-site verifications due to the pandemic, adjustments were made to the methods for obtaining data for months with missing coal quality reports. Emission data accounting formulas were optimized, reducing the number of formulas for measuring power generation sectors from 27 to 12 and replacing parameters that require complex calculations such as

"amount of electricity supply" and "heat-supply ratio" with directly measurable data such as "amount of electricity generation" and "amount of heat generation." Key emitting entities are required to develop and strictly implement data quality control plans, clearly specifying provisions for key parameters in carbon emission accounting, measuring equipment, and handling of missing data, standardizing internal management systems for data quality, and strengthening key emitting entities' carbon emission accounting capabilities. China also started to explore the application of the continuous emission monitoring system (CEMS) for CO_2 emissions. Since 2021, carbon emission monitoring and assessment pilots have been conducted in key sectors such as thermal power, iron and steel, and cement. As of March 2024, CEMS equipment has been installed at 152 spots in 72 enterprises. Research is being carried out on equipment selection, monitoring spot selection, comparison and analysis of accounting and monitoring data, and evaluation of automatic monitoring results. Specialized verification guidelines for the power generation sector have been released to address issues such as inconsistent detail and inaccurate key components in verification reports. These guidelines developed standardized procedures and mandatory verification requirements, proposing "check, inquire, observe, and verify" methods for 18 key parameters, thereby ensuring consistent verification criteria and boundaries.

Column 2: Carbon emission reporting and verification in 2023

In 2023, Competent deparments of ecology and environment at provincial level organized 92 verification agencies and 2,702 staff members to review the 2022 carbon emission reports for the power generation sector. Some regions explored innovative supervision methods by introducing certification exams for verification personnel, ensuring they are qualified to conduct their tasks. Several regions carried out random inspections to supervise the review process and evaluate the capabilities of the verification personnel. In collaboration with market regulatory authorities, some areas re-tested coal samples retained from key emitting entities to ensure the credibility of the inspection and report results. Evaluations indicated that verification personnel have gained a deeper understanding of technical specifications, leading to more standardized review processes and consistent technical assessments. The quality of verification work has significantly improved, with non-compliance issues identified by verification agencies decreasing by approximately 35.7 percent compared to 2022. The rate of first-time rectification for non-compliance issues reached about 92 percent, a notable improvement from the previous year.

ii.Implementation of a three-tier joint review and monthly recorded data

A three-tier joint review system at the national, provincial, and municipal levels has been established for the monthly recorded data of key emitting entities. Key emitting entities are required to submit key parameters and supporting materials for emission accounting through the National Carbon Trading Market Management Platform on a monthly basis. Competent departments of ecology and environment at National, provincial, and municipal levels conduct regular reviews. Using big data

technology, abnormal data is promptly identified and early warnings are issued. This has enabled comprehensive, full-process, and routine supervision over the registry of key emitting entities, the compilation and implementation of data quality control plans, monthly recorded data, emission reporting, and verification. Identified issues are promptly transferred to local authorities for verification, ensuring that key emitting entities implement necessary corrections. Since March 2023, the on-time submission rate of monthly recorded data by key emitting entities has consistently remained at 100 percent, with the number of problems significantly reduced and effectively resolved.

iii.Specialized supervision and support on emission data reporting quality

Since 2021, the Ministry of Ecology and Environment organized three rounds of supervision and assistance campaigns to enhance the quality of emission reporting for key emitting entities. Experts and law enforcement specialists were dispatched across the country to conduct on-site supervision of about 538 key emitting entities distributed across 25 provinces and 73 cities for identified issues, clear criteria were established, along with standards for case closure and itemized lists for supervision and rectification. Additionally, follow-ups on the rectifications from the first compliance cycle were continually conducted. A total of 54 administrative penalties were imposed across various regions for data quality issues, with a total market value of penalties and canceled CEAs equivalent to 1.4 billion yuan.

iv.Strengthening management capabilities

In 2023, competent departments of ecology and environment at

various levels held 134 training sessions regarding the development of the National ETS. These sessions attracted approximately 11,600 participants. The Ministry of Ecology and Environment organized six sessions specifically targeting data quality management. Attendees included representatives from competent departments of ecology and environment at the provincial and municipal levels, key emitting entities, and verification institutions. Forty training videos were produced through the National Carbon Trading Market Management Platform and online training that reached more than 10,000 participants were held. An expert panel for China's national carbon emissions trading market was formed, which has provided timely responses to address 688 technical and policy questions encountered by participating entities.

VI. Launch of the National Voluntary Greenhouse Gas Emission Reduction Trading Market

To mobilize society-wide participation in greenhouse gas emission reduction, the National Voluntary Market was officially launched on January 22, 2024. The market is led by the government and emphasizing the voluntary nature and the role of the market, in line with international practice. It strengthens information disclosure and public oversight, upholds market integrity, equity, and transparency, and contributes to achieving the "dual carbon" goals.

i.Developing the fundamental institutional framework

In 2023, the Ministry of Ecology and Environment and the State Administration for Market Regulation jointly released the Measures for the Administration of Voluntary Greenhouse Gas Emission Reduction Trading (Trial). This established the overall approach, work processes, and rights and responsibilities of market participants in the National Voluntary Market (as shown in Figure 5). It requires project owners and third-party validation and verification bodies to make dual commitments regarding the authenticity and compliance of voluntary emission reduction projects and their emission reductions. The State Administration for Market Regulation issued the Implementation Rules

for Validation of Voluntary Greenhouse Gas Emission Reduction Projects and Verification of Emission Reductions and approved the first batch of third-party validation and verification bodies. The National Center for Climate Change Strategy and International Cooperation (National Voluntary Greenhouse Gas Emission Reduction Registration Institution) released the Rules for Voluntary Greenhouse Gas Emission Reduction Registration (Trial) and the Guidelines for Voluntary Greenhouse Gas Emission Reduction Project Design and Implementation. The China Beijing Green Exchange (National Voluntary Greenhouse Gas Emission Reduction Trading Institution) formulated and issued the Rules for Voluntary Greenhouse Gas Emission Reduction Trading and Settlement (Trial). These relevant policies, regulations, and technical specifications provide comprehensive guidance on all processes and elements for participating entities.

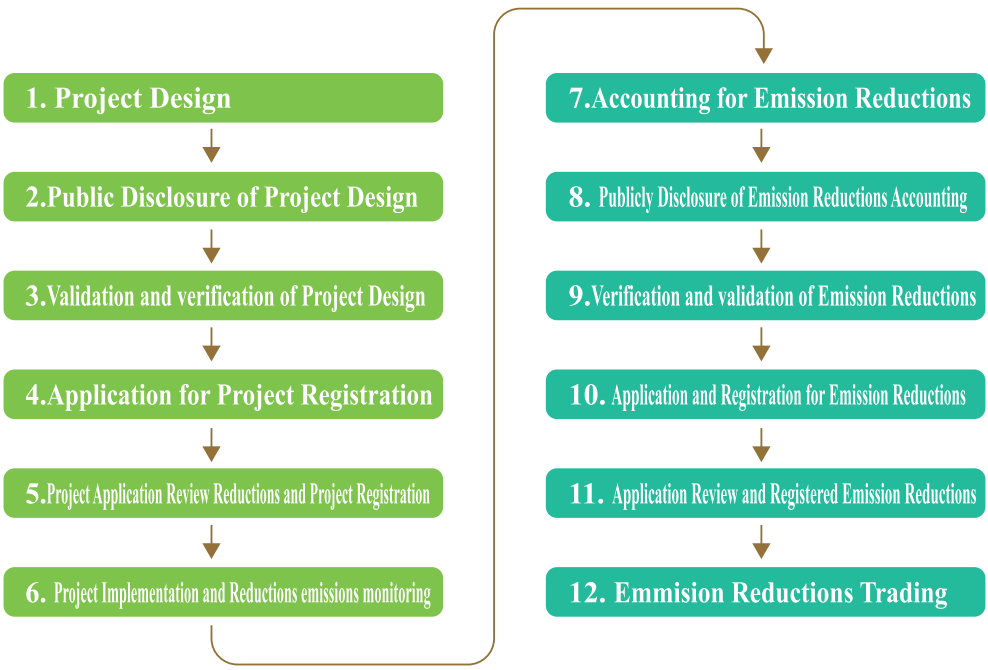

Figure 5. Design and implementation process of the National Voluntary Market

Column 3: General criteria for voluntary greenhouse gas emission reduction projects and emission reductions

Voluntary greenhouse gas emission reduction projects and emission reductions must meet general criteria, including authenticity, additionality, uniqueness, and conservativeness. ***Authenticity*** *means certified voluntary emission reductions must be genuine, accurate, and reliable.* ***Additionality*** *refers to voluntary emission reduction projects that should help overcome barriers related to internal rate of return, financing, and critical technologies. The project's greenhouse gas emissions should be lower than the baseline emissions, or its greenhouse gas removals should be higher than the baseline removals.* ***Uniqueness*** *means the project must not participate in other greenhouse gas emission reduction trading mechanisms; there should be no instances of project duplication or double-counting of emission reductions.* ***Conservativeness*** *refers to the practice of using conservative methods for estimation and value assessment when precise judgments for relevant parameters or technical pathways are difficult during the accounting or verification process of voluntary greenhouse gas emission reduction projects. This ensures that project emission reductions are not overestimated.*

ii.Release of the first batch of project methodologies

In March 2023, the Ministry of Ecology and Environment publicly solicited voluntary greenhouse gas emission reduction project methodologies, receiving a total of 361 submissions. After scientific evaluation and selection, based on principles such as high social expectation, clear emission reduction mechanisms, guaranteed data quality, combined social and ecological benefits, and ensuring effective supervision, the first batch of four methodologies was released. These

methodologies include forestation carbon sequestration, grid-connected solar thermal power generation, grid-connected offshore wind power generation, and mangrove afforestation, supporting the development of forestry carbon sequestration and renewable energy projects.

iii.Innovative projects and management methods on emission reduction data quality

To guarantee authentic, long-lasting, and additional emission reduction effects and strengthen data quality management, the Ministry of Ecology and Environment considered potential risks for voluntary emission reduction projects in various fields. Key technical components for project validation and emission reduction verification were added to the project methodologies, strengthening targeted data quality management for project owners and validation and verification bodies. On this basis, the feasibility of online management of measurement data is being explored. By utilizing information technology tools, real-time data verification can be achieved, ensuring the quality of projects and emission reductions from the data source.

VII. Robust digital infrastructure for China's National Carbon Market

The National Carbon Trading Market Management Platform, registration system, trading system, and other infrastructure operate safely and stably, achieving interconnection among various systems, which contributed to the integrated management of all business processes, centralized data collection throughout the entire process, and a comprehensive scientific decision-making process.

i.Establishment of National Carbon Trading Market Management Platform

The National Carbon Trading Market Management Platform is an integrated management system that serves the full process of carbon emission data management, quality supervision, and verification management. In February 2023, the platform was officially launched to adopt information technology tools such as big data to enable automatic detection and verification of abnormal emissions data and related parameters and provide early warning for suspicious data, which digitized and optimized key aspects of carbon emission data management. Users include regulatory authorities, key emitting entities, technical service institutions, and other stakeholders. It has enriched

the technical methods of data quality management and significantly improved efficiency. A National Carbon Trading Market Information Network website and a social media account have been launched to release authoritative information on China's National Carbon Market. To date, the social media account has over 7,000 followers, and the website and social media account have received 70,000 visits.

ii.Optimization of the national carbon emission registration system and trading system

The national carbon emission registration system and trading system are undergoing constant optimization and upgrading, with strengthened daily operation and maintenance management. Daily collaboration mechanisms have been established within competent departments of ecological and environmental at the provincial level to secure smooth CEAs allocation, trading, surrendering, and offsetting. During the second compliance cycle, the national carbon emission registration system supported the issuance and surrendering of over 10 billion tonnes of CEAs. System functions such as compliance completion certificates and compliance risk early warnings were developed and launched, achieving unified serial number management of CEAs. The National ETS successfully labeled CEAs for 2021 and 2022 and price information for the national carbon emission trading market, sending a unified price signal. The two systems have provided over 200,000 services to 2,257 key emitting entities and other market participants.

iii.Launch of the national voluntary greenhouse gas emission reduction registration system and trading system

The national voluntary greenhouse gas emission reduction registration system and trading system are crucial infrastructures for the National Voluntary Market. Currently, the development of these systems have been launched for business operation, with 4,582 accounts. The registration system provides registration and cancellation services for voluntary emission reduction projects and emission reductions, while the trading system offers centralized and unified trading and settlement services for certified voluntary emission reductions to market entities. Meanwhile, the two systems align with widely accepted international standards, to achieve unique serial numbers for certified voluntary emission reductions.

VIII. Growing effectiveness of China's National Carbon Market development

i.Enterprises' carbon emission management capabilities have been effectively strengthened

China's national carbon market has ensured that enterprises fully assume their responsibilities to abate carbon emissions, raising society-wide low-carbon awareness that "emissions come at a cost and reductions yield benefits." Key emitting entities in the power generation sector have established internal control systems for carbon emission management, with over 80 percent assigning dedicated personnel for carbon assets management and incorporating it into daily operation activities. The majority of key emitting entities have assessed their emission reduction potential and costs, actively adopting emission mitigation measures such as low-carbon technology retrofits and production process optimization and implementing emissions reduction as internal assessments. Most key emitting entities use measuring methods to get values of elemental carbon content.

ii.Enhanced effectiveness of sector emission reduction

Compared to setting mandatory restrictions on production and emission, the carbon emission trading mechanism distributes resources for carbon

emission reduction through market means, providing enterprises flexibility on emission mitigation and driving sector emission reduction. Under the premise of ensuring the rapid development of the power sector and energy security, in 2023, the emission intensity of national thermal power generation (CO_2 emissions per unit of electricity by thermal power generation) decreased by 2.38 percent compared to 2018, while the emission intensity of electricity generation (CO_2 emissions per unit of electricity generation) decreased by 8.78 percent compared to 2018. The carbon market's guiding role in promoting greenhouse gas reduction, facilitating energy mix adjustment, as well as encouraging the efficient and restraining the inefficient has become more evident.

iii.Fundamental role of carbon pricing mechanism has begun to take effect

On April 24, 2024, the closing price of the National ETS exceeded 100 yuan per tonne for the first time. The green finance attributes of CEAs are gradually gaining recognition from the market, with market prices being seen as an anchor for climate investment and financing, carbon assets management, and CEAs pledging. This encouraged green and low-carbon investment and led to notable improvements in energy efficiency within the thermal power generation sector, facilitating energy mix adjustment, and promoting high-quality green and low-carbon development.

iv.Consolidated carbon emission statistics and accounting

Pursuant to China's national circumstance, a comprehensive, scientific, effective, and internationally aligned carbon emission data statistics, accounting and management system has been established, through

building a long-term supervision mechanism and cracking down on fraudulent practices strictly. Monthly data and updates at the installations and enterprise level have covered over 40 percent of China's national CO_2 emissions. The standardization, accuracy, and timeliness of carbon emission statistics and accounting have been improved. The measured data of key parameters such as fossil fuels provide basic data support for the scientific formulation and release of the annual CO_2 emission factors for electricity generation, regional power grid baseline emission factors, and establishing and improving carbon footprint management systems. A large number of professionals and relevant entities in carbon reduction and carbon management have been cultivated, laying a solid foundation for achieving the "dual carbon" goals.

v.The technical service system and market have begun to take shape

A large number of qualified technical institutions have been cultivated by strengthening institutional management, clarifying responsibilities and liabilities, optimizing technical specifications, and enhancing supervision and inspection. In 2023, over 50 consulting firms provided annual emission report formalization for key emitting entities, more than 450 inspection and testing institutions conducted routine reviews on fuel usage by key emitting entities, and nearly 100 verification agencies engaged in the technical verification of annual emission reports submitted by key emitting entities. Competent departments of ecology and environment at the provincial level evaluated the services provided by verification agencies, with 99.7 percent of the 16,611 evaluations rating the timeliness and quality of work as qualified.

IX. Strengthening international cooperation in carbon market development

The Chinese government upholds the United Nations Framework Convention on Climate Change (UNFCCC) principles of equity, common but differentiated responsibilities, and respective capabilities and promotes the full, balanced, and effective implementation of the Paris Agreement. China actively participates in international negotiations on the global carbon market mechanism under Article 6 of the Paris Agreement, fully respects each country's sovereignty and different national circumstances, and makes positive contributions to promoting the establishment of a scientific, fair, and reasonable global carbon market mechanism.

The Chinese government has attached great importance to international cooperation in the national carbon market. Regarding the construction of the carbon market systems, multi-faceted exchanges, dialogues, and cooperation have been conducted with the EU, Germany, Norway, BRICS countries, and Belt and Road Initiative (BRI) partner countries. Successive China-EU ministerial dialogues on carbon emissions trading policies have been held, and the China Carbon Market Conference 2023 was held in Shanghai to share experience and promote mutual learning.

Various carbon market capacity-building activities have been organized to strengthen the foundation for carbon market implementation. China has actively conducted research on key topics in the carbon market and collaborated with international organizations. For example, China has cooperated with the World Bank on the study of monitoring, reporting, verification, and CEAs allocation to continuously optimize system design. International exchanges in the voluntary emission reduction trading market have been enhanced to explore feasible paths for the National Voluntary Market to participate in the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

International attention to China's National Carbon Market has increased continuously. With more and more global emission reduction efforts, carbon markets are increasingly recognized as an essential policy tool for emissions mitigation. China's National Carbon Market covers the largest amount of greenhouse gas emissions, with a significant impact on the carbon price and effectiveness of carbon trading mechanisms around the world. Its establishment and operation have attracted great attention from the international community. With an intensity-based objective, the National ETS enforces greenhouse gas emission reduction responsibilities onto enterprises and provides incentives to curtail emissions. It demonstrates the flexibility and applicability of the carbon market-based mechanism. China's National Carbon Market has contributed an innovative "Chinese approach" to the global carbon market mechanism.

Outlook

China's economic and social development has entered a high-quality stage characterized by accelerated green and low-carbon development. As the world's largest developing country, China has a series of arduous tasks ahead, including economic growth, improving people's livelihood, environmental governance, and energy security. It will continue to advance industrialization and urbanization, with its reliance on heavy industries and a coal-dominated energy mix. In addition, the time frame for reaching peak emission is tight. It will require extraordinary hard work to achieve the "dual carbon" goals.

The carbon market is an effective long-term driver to induce low-carbon production and lifestyle changes across society, providing an efficient approach to balancing economic growth and emission mitigation. In the future, China's national carbon market role as an essential policy tool to achieve the "dual carbon" goals and its principal role in the carbon pricing mechanism will be strengthened.

Building a carbon market is a complex systematic project. China's National Carbon Market is still at the initial stage and its institutional systems need to be further reinforced. It still needs to be improved in many aspects, including the coverage of sectors, trading methods, trading entities and product varieties, market vibrancy, market

functions, and data quality management capabilities.

Next, China will continue to improve relevant policy-supporting systems for the National ETS. While extensively considering factors such as sector carbon emissions, data quality, the synergy between pollution reduction and carbon emission reduction, and high-quality sector development, China will work to increase coverage of key sectors through the National ETS in stages. China will gradually implement a combination of free and paid CEAs allocation methods, gradually increasing the proportion of paid allocation to make carbon prices more accurately reflect the emission reduction costs of enterprises. China will continuously enrich trading product varieties, trading entities, and trading methods, further enhance market vibrancy, and improve the price discovery function. At the same time, China will actively develop the National Voluntary Market with high-quality carbon credits, constructing a scientific, fair, open, transparent, widely-participated system that aligns with international standards. Priority support will be given to the development of projects in ecosystem carbon sequestration, renewable energy, methane emission control, energy conservation, and efficiency improvement. The application of low-carbon, zero-carbon, and negative-carbon technologies will be promoted. Efforts will be made to explore the application of information technology tools to strengthen data quality management, and promote the widespread application of certified voluntary emission reduction.

China will further deepen international exchange and cooperation, actively participate in bilateral and multilateral processes of global

climate governance, and advance new progress in negotiations on global carbon market mechanisms. China will enhance cooperation with relevant countries, regions, and international organizations, engage in policy dialogues with all parties on carbon market development, and strengthen research support and capacity-building cooperation. China will accelerate process to build a more effective, more vibrant, and more internationally influential carbon market, and strive to make greater contributions to addressing global climate change.

Milestones

2023

On February 4, the Ministry of Ecology and Environment (MEE) released the Notice on Strengthening Management of Enterprise Greenhouse Gas Emissions Reporting in the Power Generation Industry for 2023-2025.

On February 4, the National Carbon Trading Market Management Platform was launched.

On March 13, the MEE released the Implementation Plans on National Carbon Emissions Trading Allowance Setting and Allocation in the Power Generation Industry for 2021 and 2022.

By March 31, key emitting entities in the power generation sector submitted the previous year's greenhouse gas emissions report.

From June 12 to June 21, the MEE conducted the second round of actions to supervise and support the quality improvement of carbon emissions reports.

On June 30, the competent departments of ecology and environment under the provincial-level governments completed the verification tasks

for the 2020 greenhouse gas emissions reports from key emitting entities in the power generation sector.

On July 14, the MEE released the Notice on Allowance Surrender of the National Carbon Emissions Trading Market for 2021 and 2022.

On August 11, the National Carbon Emission Registry completed the allocation of the CEAs.

On August 28, the national carbon emissions trading system categorized Carbon Emission Allowance 21 and Carbon Emission Allowance 22 and released information on price trends for the national carbon emission trading market.

On October 14, the MEE released the Notice on Key Industrial Enterprises Greenhouse Gas Emissions Reporting and Verification in 2023-2025, which covers sectors such as petrochemicals, chemicals, building materials, iron and steel, non-ferrous metals, paper, and civil aviation.

On October 19, the MEE and the State Administration for Market Regulation (SAMR) jointly issued the Measures for the Administration of Voluntary Greenhouse Gas Emission Reduction Trading (Trail).

On October 24, the MEE issued four methodologies of voluntary greenhouse gas emission reduction projects, including forestation carbon sequestration, grid-connected solar thermal power generation, grid-connected offshore wind power generation, and mangrove afforestation.

On November 8, the China Carbon Market Conference 2023 was held in Shanghai.

On November 16, the National Center for Climate Change Strategy

and International Cooperation (National Voluntary Greenhouse Gas Emission Reduction Registration Institution) issued the Guidelines for Design and Implementation of Voluntary Greenhouse Gas Emissions Reduction Projects and the Registration Rules for Voluntary Greenhouse Gas Emissions Reduction (Trial). Additionally, the China Beijing Green Exchange (National Voluntary Greenhouse Gas Emission Reduction Trading Institution) issued the Trading and Settlement Rules for Voluntary Greenhouse Gas Emissions Reduction (Trial).

On December 25, the SAMR released the Measures for the Administration of Voluntary Greenhouse Gas Emission Reduction Trading (Trail), which regulates the basis, workflow, and general requirements for project approval and emission reduction verification.

On December 31, the national carbon emissions trading market successfully concluded its second compliance cycle.

▶ 2024

On January 22, the National Voluntary Market was launched.

On January 25, the Interim Regulations for the Management of Carbon Emission Trading was released.

On February 26, the State Council Information Office held a routine policy briefing on the Interim Regulations for the Management of Carbon Emission Trading.

By March 31, key emitting entities in the power generation sector submitted the greenhouse gas emissions reports of 2023.

On April 24, the composite price of trading in the National ETS exceeded 100 yuan per tonne for the first time.

On May 1, the Interim Regulations for the Management of Carbon Emission Trading came into effect.

From May 7 to May 16, the MEE conducted the third round of actions to supervise and support the quality improvement of carbon emissions reports.

On June 11, the SAMR released the first batch of institutions authorized for the approval and verification of voluntary greenhouse gas emission reduction projects.

On June 30, the competent departments of ecology and environment under the provincial-level governments completed the verification tasks for 2023 greenhouse gas emissions reports from key emitting entities in the power generation sector.

On July 21, the China Carbon Market Conference 2024 is held in Wuhan.

Welcome to Visit the National Carbon Trading Market Information Network Website

- **Introduction:**
  The National Carbon Trading Market Information Network is the main platform for disclosing information about China's National Carbon Market, interacting with and communicating with the public. It provides society-wide access to relevant policies and regulations, news updates, educational and professional knowledge, and related research findings.

- **Website:** https://www.cets.org.cn